El Salvador - Rural Electrification

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Overview

Identification

COUNTRY
El Salvador

EVALUATION TITLE
Rural Electrification

EVALUATION TYPE
Independent Impact Evaluation

ID NUMBER
DDI-MCC-SLV-IE-ENERGY-2014-v1

Version

VERSION DESCRIPTION
- v01: Edited, anonymous dataset for public distribution.

Overview

ABSTRACT
The impact evaluation seeks to determine the impact of electrification on the cost of energy, energy consumption, time

allocation, and household income. Because the new electric lines will come from the existing power grid, an experimental design is not feasible for the overall impact evaluation. Therefore, the evaluators will combine two parallel approaches. The first approach to evaluate the overall impact of the project will use a non-experimental design taking advantage of the timeline of the rollout of the project and using propensity score matching to identify treatment (households that receive the new electrical service) and control groups (households that do not receive new service). Using specialized household surveys for both the household head and his/her spouse and with an intra-household time allocation module, the evaluators will estimate the differences in energy consumption, household income, and time use between the treatment and control groups. A difference-in-difference estimation method will control for changes in non-observable variables, and instrumental variables estimation will control for any remaining potential sources of selection bias.

The second approach will focus on the first set of households to be connected to the electricity grid, i.e. a subsample of towns and households from the full sample being evaluated. From this sub-sample of households we will select randomly an additional control and treatment group. The treatment group will be randomly assigned vouchers for 20% and 50% of the cost of the installation of the connection that the households/business will need to pay in order access the electricity once the cable reaches their household/business (the average cost is around 120 US$). Vouchers will be assigned randomly to 400 eligible survey respondents. The vouchers would not only encourage a sufficient level of demand for electricity access in the early stages of intervention, but would also provide a basis for experimental evaluation of accessibility to electricity by serving as an instrumental variable for electricity access. The randomly selected control towns and households will serve as an appropriate control group given that they will receive no vouchers.

EVALUATION METHODOLOGY
Propensity Score Matching

UNITS OF ANALYSIS
Individuals, households, community

KIND OF DATA
Sample survey data [ssd]

TOPICS

Topic	Vocabulary	URI

Topic	Vocabulary	URI
El Salvador		
impact evaluation		
energy		
propensity score matching		
random assignment		
vouchers		

KEYWORDS
El Salvador, impact evaluation, propensity score matching, random assignment, vouchers, energy

Coverage

GEOGRAPHIC COVERAGE
The study includes only two departments, Chalatenango and San Miguel. These departments are proposed because they include the largest numbers of cantons that will benefit from the electrification program. In addition, these districts include a number of cantons that will be benefited from the road improvement and the electrification programs. Although rather modest, these districts will play a key role in the study of complementarities between road improvement and electrification.

The evaluation will use household surveys and community surveys. To identify the households to be sampled, a census of the selected areas was implemented and a sample framework was developed which include a variable that identified if the household had access to electricity or not. From the sample framework a stratified random sample was selected within the household which did not have access to electricity at the moment of the pre-census. The household survey will interview approximately 1,532 households especifically for the electricity sub-activity impact evaluation.

UNIVERSE
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Producers and Sponsors

PRIMARY INVESTIGATOR(S)

Name	Affiliation
Social Impact	Independent Evaluator

FUNDING

Name	Abbreviation	Role
Millennium Challenge Corporation	MCC	

Metadata Production

METADATA PRODUCED BY

Name	Abbreviation	Affiliation	Role
Millennium Challenge Corporation	MCC		Review of Metadata

DATE OF METADATA PRODUCTION
2014-09

DDI DOCUMENT VERSION
Version 1 (2014-8-7)

Version 1.1 (2014-9-30) - Evaluator updated some field activities detail

DDI DOCUMENT ID
DDI-MCC-SLV-IE-ENERGY-2014-v1

MCC Compact and Program

COMPACT OR THRESHOLD
El Salvador

PROGRAM
In November of 2006, the Millennium Challenge Corporation (MCC) signed a five-year, $461 million Compact with the Government of El Salvador (GOES) to improve the lives of Salvadorans through strategic investments in education, public services, agricultural production, rural business development, and transportation infrastructure. The Government of El Salvador has set up a management unit called FOMLIENIO to implement the 5 year Compact from September 2007 to September 2012. Social Impact has been contracted by MCC to conduct an impact evaluation of the rural electrification activity of the Compact. The Rural Electrification activity of the El Salvador Compact is expected to expand the electricity network to reach 47,000 households in the Northern Zone, resulting in 97 percent coverage in this region. It is estimated that household income will increase by at least 15%. The project includes: · Construction of approximately 1,500 km of new distribution lines and the corresponding connection of approximately 21,000 households to the expanded network; Connection of approximately 25,000 households to existing networks via the construction of necessary low voltage extensions; and · Installation of approximately 950 solar power systems and provision of technical assistance for the creation of community associations for the management of solar power system operations and maintenance

MCC SECTOR
Energy (Energy)

PROGRAM LOGIC
During the design phase of the rural electrification project, MCC and the Government of El Salvador developed an economic rate of return (ERR) model to compare the expected benefits and costs of the project. The main benefits in the model became the monitoring and evaluation indicators and will be the focus of the impact evaluation. They are the following: Household income/welfare · Price of electricity per kilowatt-hour · Consumption of electricity · Time allocation Other indicators indicators of changes in quality of the electricity service: o Use of electricity o Expenditure in electricity (proportion of total energy sources) o Expenditure in electricity (proportion of total expenditure) o Number of failures o Price o Sources of energy Impacts on overall welfare will be proxied through the following indicators: o Change in total income and expenditure o Total hours of work – household o Hours of work – household and individual o % hours of non-ag work household and individual o Hours spent on chores (specially collecting inputs for energy) o Hours spent on childcare

Sampling

Study Population

The evaluation will use household surveys and community surveys. To identify the households to be sampled, a census of the selected areas was implemented and a sample framework was developed which include a variable that identified if the household had access to electricity or not. From the sample framework a stratified random sample was selected within the household which did not have access to electricity at the moment of the pre-census. The household survey will interview approximately 1,532 households especifically for the electricity sub-activity impact evaluation.

Sampling Procedure

The evaluation will use household surveys and community surveys. To identify the households to be sampled, a census of the selected areas was implemented and a sample framework was developed which include a variable that identified if the household had access to electricity or not. From the sample framework a stratified random sample was selected within the household which did not have access to electricity at the moment of the pre-census.

The household survey will interview approximately 1,532 households.

Questionnaires

Overview

The household questionnaire includes two sections - one that will be answered by the primary male household representative (including household income and agricultural productivity) and will be administered by a male enumerator, and the second which will be answered by the primary female representative in the household (including household demographics, time allocation, and expenses) and administered by a female enumerator. The survey has detailed sections for each of the outcomes to be evaluated, both intermediate and final outcomes. In addition, and to be able to control for accessibility to markets, each of the survey households was geo-referenced. If both persons are not present at the time of the first visit, enumerators will attempt to make an appointment and return again to interview the appropriate person, provided that this return visit is possible within the time that the survey team will be in the area. When possible, a second adult can also be included in the interview process, particularly for the questions related to work and agricultural output. The survey is designed to take between 1 and 1 ½ hours for each questionnaire (i.e. male and female). In follow-up years the survey instrument consists of shorter questionaire that is administered to the person in the households that is best informed for each section.

The community survey will be applied to communities where selected households live. This survey will gather information about the local economy; price levels for food, basic commodities, and water and sanitation related expenditures; community infrastructure and access key markets and social services. The goal of the surveys is to provide some context for the information gathered in the household surveys, to track community-level changes that may affect outcomes, and to reduce the required length of the household survey questionnaire.

Data Collection

Data Collection Dates

Start	End	Cycle
2008-11	2009-02	N/A
2010-11	2011-02	N/A
2011-11	2012-02	N/A
2012-11	2013-02	N/A
2013-11	2014-02	N/A

Data Collection Notes

Interviewing was conducted by teams of interviewers. Each interviewing team comprised of 3-4 interviewers, and a supervisor, and a driver.

The role of the supervisor was to coordinate field data collection activities, including management of the field teams, supplies and equipment, finances, maps and listings, coordinate with local authorities concerning the survey plan and make arrangements for accommodation and travel. Additionally, a chief field supervisor assigned the work to the supervisors/interviewers, spot checked work, maintained field control documents, and sent completed questionnaires and progress reports to the central office.

The team 2 coordinators for data entry and quality control that were responsible for managing the headquarter team reviewing each questionnaire, checking for missed questions, skip errors, fields incorrectly completed, and checking for inconsistencies in the data. For the follow-up surveys electronic devices where specifically programmed for the survey that automatically performed checks of the data in the field.

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Data Collectors

Name	Abbreviation	Affiliation
Dirección General de Estadísticas y Censos	DIGESTYC	

Data Processing

No content available

Data Appraisal

No content available